Earth's Materials and Changes

3-3 The student will demonstrate an understanding of Earth's composition and the changes that occur to the features of Earth's surface. (Earth Science)

3.3.2 Identify common minerals on the basis of their properties by using a minerals identification key.

Taxonomy level: 1.1-A, B Understand Factual, and Conceptual Knowledge

Previous/Future knowledge: Minerals are introduced as new material for 3rd grade. They will be further studied in 8th grade (8-3.5) when students will summarize the importance of minerals, ores, and fossil fuels as Earth resources on the basis of their physical and chemical properties. In high school Earth Science (3.7), students will classify minerals and rocks on the basis of their physical and chemical properties and the environment in which they were formed.

It is essential for students to know that *minerals* are solid, formed in nature, have never been alive, and have properties by which they can be identified. Some examples of physical properties of minerals may be:

Hardness

- Hardness refers to whether the mineral can be scratched or can scratch something else.
- The harder a mineral, the fewer things can scratch it.
- The hardness is numbered 1-10 with 1 being the softest and 10 being the hardest. Diamond is the hardest mineral.

Color

- Color can be used along with other properties to help identify a mineral.
- Since many minerals have the same color, it cannot be used as the only property for identification.

Luster

- Some minerals can be very shiny, pearly, or glassy and other minerals are dull.

Special Properties

- If an acid (vinegar) is placed on a mineral, it may bubble or fizz.
- Some minerals split into thin sheets. Some minerals have magnetic properties.

A *mineral identification key* is a chart that will give information about the properties of the minerals listed on the key. Properties of a given mineral are compared to those listed on the key and the mineral can be identified. Some common minerals with very observable properties might include calcite, feldspar, mica, talc, gypsum, quartz, and fluorite. A sample mineral identification key is provided.

Earth's Materials and Changes

3-3 The student will demonstrate an understanding of Earth's composition and the changes that occur to the features of Earth's surface. (Earth Science)

Sample: Minerals Identification Key

Mineral	Properties			
	Hardness (scratch test)	Color	Luster	Special Properties
Calcite	3 scratched by nail	White	Dull/Glassy	Bubbles with acid
Feldspar	6 scratches glass	Pink or white	Dull/Pearly	---
Mica	2 scratched by fingernail	Black/Gray	Shiny	Splits into thin sheets
Talc	1 easily scratched by fingernail	White	Dull	---
Gypsum	2 scratched by fingernail	White/Gray	Dull	---
Quartz	7 scratches glass	Various colors	Glassy	
Fluorite	4	Various colors		

It is not essential for students to know about crystal shape of minerals or the breakage properties of minerals. They do not need to know about the Mohs scale of hardness. The streak color of a mineral formed when the mineral is scratched across a ceramic plate is interesting but may be beyond the understanding for 3rd grade identification.

Assessment Guidelines:

The objective of this indicator is to *identify* minerals based on their properties; therefore, the primary focus of assessment should be to locate a mineral by its properties by using the information found on an identification key. However, appropriate assessments should also require students to *identify* mineral properties; or *recall* what would be observed when making an identification of a particular property.